

Remarks/Arguments

The claims have been amended to clarify that the soil engaging implement is a tillage implement. The Examiner has rejected Claims 1 and 4 - 11 under 35 USC § 102(b) as being anticipated by US Patent No. 6,062,090 to Bachhuber, et al.. Bachhuber, et al. discloses a cone penetrometer, particularly for evaluating bed surfaces for railroads and highways, and is designed to measure soil resistance in response to penetration. Similar devices are well known in the art, such as the device of ASAE Standard S313.3. These instruments do not allow real time assessments of the entire soil profile as a function of time, as contemplated by the present invention, because such devices are not drawn through the soil like a tillage implement is. The present invention incorporates sensors in a tillage implement so that soil resistance can be measured in real time while the implement is being drawn through the soil and allows for the tillage depth to be adjusted "on the fly" in response to soil resistance, rather than a stand-alone sensing device like that of Bachhuber et al. Cone Penetrometers like Bachhuber et al. are designed to be inserted vertically into the soil at one location to make a soil resistance measurement and then the device is withdrawn from the soil and inserted again at another location.

With respect to claim 1, as amended, Bachhuber et al. does not disclose a soil engaging tillage implement. Further Bachhuber et al. does not disclose two load cells and one set of strain gauges.

It should be noted that claim 5 depends from claim 2 which has not been rejected under § 102.

With respect to claim 6, Bachhuber et al. is not drawn through the soil like the tillage implement of the present invention, and therefore cannot be used to determine a linear trend of topsoil resistance pressure change with depth.

As to claim 7, Bachhuber et al. does not disclose measuring torque on the implement caused by the load transmitted through the load cells as well as the load applied to the point of the implement.

With respect to claim 8, Bachhuber et al. does not determine both measured and predicted soil resistance. Bachhuber et al. is not used for varying tillage depth so there is no need to predict soil resistance.

As to claim 9, Bachhuber et al. does not disclose the use of a free body diagram to calculate a linear distribution of soil resistance for predicting mechanical soil resistance to penetration.

With respect to claim 10 Bachhuber et al. does not disclose the use of a free body diagram to derive predicted and measured soil resistance to use as an input for guiding an implement to an appropriate operating depth.

The Examiner has rejected claim 11 as being anticipated by Bachhuber et al., yet in the § 103 rejection of claim 2 the Examiner concedes that Bachhuber et al. does not disclose a soil engaging implement having an upper end mounted to a support structure, a lower end, a point for engaging the soil mounted to the lower end, a leading edge, and a protective shin mounted to the leading edge. All of these limitations are found in claim 11. Further, the Examiner has indicated that claim 3 is allowable, yet claim 11 contains the same limitations as claim 3. Additionally, as discussed above, Bachhuber et al. does not disclose a tillage implement that is drawn through the soil, does not disclose measuring torque, does not determine predicted soil resistance and does not use measured and predicted soil resistance as inputs for varying tillage depth.

Accordingly, it is respectfully submitted that claims 1 and 4 - 11 are not anticipated by Bachhuber et al.

The Examiner has also rejected claim 2 under 35 USC § 103(a) as being unpatentable over Bachhuber et al. in view of US Patent No. 5,964,300 to Wattonville et al. It is respectfully submitted that claim 2 is not obvious in view of the Bachhuber et al. and Wattonville et al. because Bachhuber et al. is not a tillage implement and therefore a wear shin as described in Wattonville et al. would serve

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no purpose. Further, the motivation to modify Bachhuber et al. with Wattonville et al. suggested by the Examiner is not apt because Bachhuber et al. is not a tillage implement that is drawn through the soil so there is no need to improve trash and soil flow characteristics.

In conclusion, it is believed that this application is in condition for allowance, and such allowance is respectfully requested.

Should the Examiner believe that a telephonic conference would be useful in furthering the present application toward allowance, the undersigned attorney would welcome such a call.

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Respectfully,

  
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